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Planning for development in education is a process which requires fundamental changes in the world view, attitudes, knowledge, and skills of people. To satisfy future requirements for educated persons, the education system must be viewed as an instrument for the attainment of human goals, and planning must determine how many persons must learn what and how well. Because the existing system will constrain both the targets set and the direction of future changes in the system itself, the first step in planning is an assessment of this system. Assessment includes a "mapping" of the education system on a disaggregated basis with a break-down into operationally useful divisions. Trends in influence of private institutions must be anticipated since these are less manageable from the public sphere. Complete data in such relevant categories as capacity, efficiency, effectiveness, and cost are to be gathered. Targets are set and are linked to specific educational institutions by working backward from the targets to the inputs required. Limited resources will require that priorities be established among the targets. (DE)

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# PLANNING FOR EDUCATIONAL DEVELOPMENT

by

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EVALUATION CENTER
THE OHIO STATE UNIVERSITY
College of Education

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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to increase scientific knowledge of educational evaluation and planning;
to develop evaluation strategies and designs;
to develop evaluation methods and materials;
to provide instruction in evaluation;
to disseminate information related to educational evaluation;
to assist educationists in evaluating their programs.

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## Preface

This paper is being reproduced and distributed as part of The Ohio State University Evaluation Center's efforts to create widespread awareness of and concern for the problems of educational planning and evaluation. Professor Sanders originally prepared this manuscript to be used as part of the seminar materials for Human Resource Development Officers, Latin American Bureau, United States Agency for International Development. As a result, much of the material relates to developing countries and specifically to the developing countries of Latin America. However, the concepts upon which this material is based seem to be equally applicable to a great portion of the educational enterprise in the United States.

Michael S. Caldwell
Associate Director
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Program Development

## I. Conceptual

Planning for development in education involves more than making provisions for the preparation of qualified manpower for economic purposes. Beyond that "economic" goal, education serves a variety of other important ends which must be taken into account. Before we can discuss planning in education, we should agree on what education is, what its purposes are, and how it serves society.

Education is usually defined by educationists as any process which deliberately seeks to change the behavioral capability of persons. A behavioral definition of this sort is required since learning by pupils, the objective of teaching and of education, involves some ill-understood internal changes in the learner. Learning is not apparent, it is not manifest, and cannot be recognized until and unless the learner acts in some way which will permit an observer to recognize a difference, a change in his behavior. The definition proposed here is unusual only in that it utilizes the term "capability." This term is used to indicate that the behavioral changes brought about through learning are latent and may be manifested only when some relevant stimulus brings forth the learned behavior. Many things are learned through educational processes which are not manifested in behavioral change at the time of learning and which may not be manifested in the regular life of the learner. If learning has occurred, however, it will be demonstrated by relevant behavior at some appropriate occasion.

Education, in this sense, is a function performed by a variety of social institutions in all societies. The most important educative

institution generally is agreed to be the family; the institution which nurtures the infant from birth and which teaches it basic values and attitudes, fundamental skills, and basic role behavior. A substantial body of educational opinion holds that the most important learning acquired by a child is obtained during the first four or five years of life and in most societies nearly all this learning is acquired in the family, most often from the mother.

In most societies, provision of education to the young is perceived to be so important as to require that it be provided by specialist teachers. In a primitive society these may be shamans or head-men who perform other social roles in addition to the teaching role or they may be individuals who specialize exclusively in the teaching function. In more elaborate societies these specialist teachers are grouped together in schools and the schools themselves are linked in a school system.

But education, even when an elaborate school system exists, is provided by a variety of other social institutions with other primary functions. Peer groups, whether or not formally organized (as in Boy Scouts), provide significant educative experiences to members. Organized religions, mass media, economic enterprises through propaganda as well as through more formalized instructional programs such as church schools, on-the-job training or apprenticeship programs may be important educative agents. State controlled agencies may also provide education either incidentally to the performance of their primary functions (e.g., military training in auto mechanics) or as a means for executing their primary function (e.g., extension workers in Ministries of Health or Agriculture).

It is important to recognize that although education may be provided

by a variety of institutions, only some of these institutions are under direct control of the state. Organization of the national educational system, in part, may be informal and perhaps even somewhat accidental. Mass media, for example, typically are not under the control of the state and may provide education which is dysfunctional in some degree with the educative efforts of the school system. Many contend that to some degree television in the United States has this effect.

When we consider educational planning within the context of national development planning, therefore, we must clearly indicate the scope of the national system for which planning is possible. If an educational system may be defined as an interlocking network of educational processes provided by social institutions, we may think on two levels. On the global and more abstract level, the national educational system involves all institutions which provide education as defined earlier. In terms of the impact of education on the whole population and in terms of the "real" educational development of a nation, this is the national education system concept which is more appropriate. On the other hand, it has little operational meaning because it is impossible to control, and perhaps impossible to influence, the education provided by many of the relevant institutions.

Operationally, therefore, we must think of the national education system as including those agencies which receive public resources or which are controlled by the state through legal and administrative arrangements. This includes all public schools as well as private schools in most countries since they are usually subject to inspection and required to adhere to educational standards established by the state.

Some forms of "non-school" or informal education, however, are of

great significance in national development. For example, apprenticeship programs or on-the-job training may be entirely free from public regulation. Yet these institutions are of great significance to the society which seeks economic development. They must be taken into account in any attempt to plan for educational development since their capacity is crucial to the development of required human capabilities. Therefore, for planning purposes, the national educational system must be conceived as the interlocking network of educational institutions both formal and informal, school and non-school, which can be identified and which have relevance for development goals. It may be impossible in some circumstances to influence the form of development which some of these institutions will take; it is necessary, however, to estimate changes which will occur in them so that necessary educative activities can be provided by the state if independent agencies will not.

For planning purposes, then, the educational system should be conceived as including schools, both public and private, and at all levels, and all informal education activities which a) serve any significant number of persons and b) provide education in any subject or skill which has relevance for national development.

This leads us to the question: what is the role of education in national development? This is a question which cannot be answered with much assurance at our present level of knowledge because we have a crude understanding of the development process and a dim perception of what the consequences may be of any educational act or teaching effort. These are conceptual, theoretical, and research issues which now receive substantial attention by scholars. In the pragmatic world of governmental operation, however,

decisions must be made even though desired information and evidence is not yet available. Even in the absence of a desired level of understanding about the role of education in development, action must be taken.

Usually in the context of national planning, development is considered to include two dimensions, economic and social. Economic development is relatively clearly defined to mean some increase in the level of living available to a population. It may be indicated, with some difficulty to be sure, by measures of per capita income. Social development is much more ambiguous. It is usually given passing mention by technicians and governments and largely ignored in policy formulation. It is important in this discussion, however, to consider some possible meanings and indicators of social development as they may be relevant to educational policy formulation because one thing is clear: planning educational development exclusively on economic development terms is unacceptable to educationists, to economists and to governmental policy makers.

## Social Development

> "It should no longer be necessary to speak of economic and social development since development--as distinct from growth--should automatically include both. Development is growth plus change; change in turn is social and cultural as well as economic, and qualitative as well as quantitative."
>
> U.N. Secretary General (1)

Most of us concerned with development would agree with the Secretary General; the difficulty, however, is to make this conception meaningful in an operational sense. There is no single indicator, however imperfect, analogous to measures of per capita income which can provide a bench mark for the non-economic dimensions of development. Yet there is a clear need

for some usable criteria, some indices of development in the social sphere which may be used for analysis of public policy and for the formulation of programs in areas of the public service such as education which are not narrowly economic.

The problem of defining social development operationally is compounded by two important factors: first, there is no general agreement on what constitutes social progress, and inevitably the term "development" implies amelioration or progress. The other factor is that social development may involve any dimension of human life; the variables chosen as criteria could include most of the measurable phenomena of social activity. Further, some of these variables may be autonomous in development while others may be consequences of other changes. The interdependence of social variables is unclear at best in our present state of knowledge. Smelser puts the point as follows:

> "Development as a whole involves a complex series of changes in rates of growth--of output per-capita, of literacy, of political participation, etc.--and major changes in these rates depend on the occurrence of fundamental changes in the social structure of the developing society. To complicate the study of development even more, changes in one institutional sector set up demands for changes in other sectors. Rapid economic development, for instance, establishes pressure for adjustment in the education and training of a new type of labor force. Again if the educational system produces a large number of literate, skilled, but unemployable persons, this often sets up demands for economic or political adjustments to assimilate those persons into socially meaningful and perhaps economically productive roles." (2)

Since the meaning of social development is not clear and since we lack agreed measurable concepts for indicating levels achieved, it is very difficult to plan for educational policy consistent with social development. Yet this is required if basing educational policy exclusively on economic criteria is unacceptable. Fortunately, social development is generally

agreed to include, as a minimum, trends toward industrialization, urbanization, and modernization. It may be useful for us to examine these three social forces for the new requirements they will place on humans living and prospering, in a psychological if not economic sense, where such forces are running in strength.

Figure 1 indicates some of the behavioral requirements implied by industrialization, urbanization and modernization. These behavioral requirements, in turn, must be learned by increasing proportions of the population if social development is to continue and if social cost is to be minimized. Since these learnings are discontinuous with the socialization and enculturation processes of traditional societies, inevitably the major burden of providing them must fall on non-family educative agencies, primarily the schools. While carrying this burden will force the school to take leadership in widening the gap between the generations, with probable increased political pressures on the school system, the school or other educative agencies must provide these learnings if development is to proceed.

Another and less debatable set of social development objectives may be identified. These objectives are easily specified in terms of increased levels of social welfare which are defined as good in themselves rather than as consequences of other goals which may be sought. For example, the eradication of illiteracy, the provision of education to a larger proportion of the school age population, or to disadvantaged groups in the population, a reduction in mortality, morbidity, and debility rates are readily recognized as desired ends in themselves. Development objectives of this sort are much easier to formulate as operational targets for educational planning than are the consequences of industrialization and urbanization.

Figure 1

Some Behavioral Requirements of Social Development

| Factor | Behavioral Requirement |
|---|---|
| 1. Industrialization | More specialized workers--new and changing occupational roles |
| | Increasingly sophisticated functions within occupational roles |
| | Increasing occupational mobility |
| | Increasing geographic mobility |
| | Higher proportions of literate workers--able to upgrade skills through further learning |
| | Higher proportions of workers able to be self-directive problem solvers |
| | Growing numbers of persons with entrepreneurial-creative-skills and attitudes |
| | Increasing numbers of workers and consumers who understand and value rationality, scientific explanations of phenomena, cause and effect |
| | Increasing numbers of workers and managers who use merit criteria for recruitment and selection-accept "meritocracy" |
| 2. Urbanization | Increasing proportion of literate persons |
| | Increasing proportion of persons who know about and have skills for using social services and institutions which replace traditional norms and institutions |
| | Increasing proportion of persons who are able to derive personal satisfactions from secondary (Gesellschaft) associations and who are not disturbed by the reduction of primary (Gemeinschaft) associations |
| | Increasing proportion of persons who can respond readily to a changing environment--able to use problem-solving skills |
| 3. Modernization | Increasing proportion of population identifying with the polity rather than local village or tribe--sense of national participation |
| | Increasing proportion of population with knowledge and skills to participate in political processes |

Yet educational planning which is based exclusively on quantitative criteria or on manpower criteria may miss the main point in development (as it could be if a specified reduction in mortality rates is chosen as the development target and attainment of that target can be interpreted in terms of specialized health personnel and facilitites requirements). Development is a process which requires fundamental changes in the world view, attitudes, knowledge and skills of people. Educational development, which is exclusively expansion of pre-existing educational facilities, will fail to serve the development process and may well add contradictions, which will increase the tension and conflict which tend to accompany development under any conditions. Identification of these more subtle goals and their formulation as operationally meaningful targets is much more difficult than quantitative expansion of existing programs. But curricula, teaching and pupil-selection procedures in many countries require improvement in these vital qualitative dimensions of education if it is to serve the development process.

## Goals for Educational Development

The educational system of a developing country is one of the subsystems in the society which must adapt to accommodate the process of development. Like the economic system or the social system, the educational system is an institutionalized set of human interrelationships which has no intrinsic value in itself, although not infrequently people assume it has. On the contrary, these systems are means developed by men to permit the attainment of some shared goals. They are instruments through which men seek to solve shared problems or to attain shared ends.

In a developing country, even more so than in a relatively advanced one, it is necessary to perceive the educational system as an instrument, as a means for attainment of human goals. Most social institutions and systems, however, tend over time to become reified, to take on a life of their own and to persist in operating in ways that may have once been appropriate long after goals or other circumstances have changed. For this reason it is not uncommon for educational systems to be incoordinated with current conditions. This gap, in turn, has led governments to seek planned development in education. The fundamental purpose of educational planning is to establish policies and resource allocations to and within the educational system so that future national requirements for educated persons may be fulfilled. Educational planning is concerned with basically this issue: how many must learn what, how well, in order to satisfy future requirements for educated persons?

As we saw in our discussion of social and economic development, the future requirements for educated persons in a developing society are difficult to identify and to specify in operational terms. Yet this the sine qua non of rational educational policy, for if there is no clear and operationally defined target, it is impossible to evaluate performance and impossible to judge what must be done now in order to achieve satisfactory levels of performance. If there is no clear determination of goals and priorities, it is impossible for decision-makers to know whether expanding primary education enrollments is more important than adult education or expansion of the university law school. The demands for educated persons in the future society are likely to be greater than can be met and as a consequence, choices must be and are made. It is only sensible that these choices be made explicitly and in light of the best available information.

The heart of sound decision-making lies in the clear and explicit

formulation of objectives or targets. In any national educational system, the actual and potential objectives which may be sought are very many. Furthermore, decision-making is very decentralized, even in a centralized national system, since the teacher within his classroom is traditional, and in fact, "king." The specific objectives sought in teaching, whether they are made explicit or not, are determined in practice by the individual teacher. Of course, the teacher's freedom of choice is not infinitely wide. It is constrained by the teacher's perception of what is desirable or possible, by some limits which may be imposed formally or informally by the group of teachers in a given school or city, by the school directors, boards of control, parents and citizens and by national or local administrative authorities. However, because of this inevitable independence of teachers, and for perfectly valid professional reasons as well, tactical decisions about immediate goals for the education of specific groups of pupils must be left in the hands of local school personnel, especially the classroom teacher.

But on a policy level, with regard to decisions about global allocations of resources for the attainment of general policy objectives, responsibility rests with higher administrative authority: ministers and subdirectors of education, rectors and faculties of universities, directors of private schools and directors of economic enterprises which provide vocational preparation. It is this level, where global allocations of resources for education are made, at which the process of planning is most useful.

Planning is a way to make explicit choices in light of the best available information. It is not a technique which provides ready-made solutions; in fact, it may make decision-making even more difficult than it is in an unplanned system since planning necessarily requires explicit consideration of the issues involved in a decision and may by that fact increase

opportunities for disagreement among the various power centers involved. Yet, to my way of thinking, even if disagreement is focused and given an opportunity to become articulate, this will contribute to a net national advantage since whatever decisions are taken will be made after explicit consideration of the objective factors involved.

Planning, then, is a process whereby available means are allocated to desired ends in education in an explicit way in order to maximize the chance that these ends will be achieved during the planning period. Let us now consider the planning process as it relates to education in terms of system assessment, of target setting, educational output, and educational input strategies.

## II. Methodological

### Educational System Assessment

As a first step in educational planning, assessment of the existing set of educational services is necessary. Out of a thorough assessment will arise some of the targets for development and an understanding of the technical relationships within the educational system which will constrain whatever development strategies ultimately may be chosen. At the outset we should be clear about the distinction between the stock of educated persons in the society and the supply of educational services, the institutions which are a national resource in the sense that they must produce future increments in the national stock of educated persons. In this section we shall consider assessing the stock of available educational services; in our discussion of target setting we shall include the assessment of the national stock of educated persons.

In conducting an assessment the first task is to prepare a "map" of the national educational system. This schematic diagram of all of the relevant educational services now extant in the society is a necessary point of departure since usually no single individual, even senior employees of the Ministry of Education, has a clear picture of the national educational system. It will be recalled that we defined an educational system as an interlocking network of educational processes or institutions. Let us now define educational processes in this context as educational divisions: a homogeneous instructional unit in which the education provided to students tends to be uniform. That is, a division is an instructional unit in which the pupils, program, teachers, administrative authority and/or financing are uniform. It is the basic analytical unit in planning and assessment. We may then redefine the educational system as an interlocking network of educational divisions.

The basic concept of "educational divisions" is necessary in order to root the planning process firmly in reality. A school type (e.g., secondary vocational education) or a school level (e.g., secondary education) is not a sufficiently detailed concept for planning purposes. If one were to analyze and plan for national educational development through the use of these broad and imprecise concepts, as indeed has been done, distortion is necessarily introduced. For example, secondary level education in vocational trades is not the same as general secondary education in terms of pupil selection, background or motivation, curricula and teaching methods, teacher, classroom or materials requirements, or cost of operation. Further, schools which operate under the authority of different agencies, private schools or schools operated by a Ministry of Labor, and informal vocational programs

such as apprenticeship, probably operate under different financial and administrative arrangements. Allocational decision-making about these types of divisions is, or may be, independent of the central educational authority. Therefore, planned development in these divisions may proceed independently of the public system. In order to minimize the overall national costs of educational development the changes expected in the private educational sector must be anticipated and the public strategy must adapt and adjust to this development. For this reason, original assessment and analysis, and later planning, if done in terms of educational divisions will permit the determination of policy in a sufficiently detailed manner to reflect the objective facts of educational organization. Further, if data are collected originally in maximum disaggregated form, later aggregation for specific purposes is possible; the reverse process, however, is not possible.

The scope of the educational assessment should be national in the first instance. However, since allocational decisions on a regional basis will ultimately be required, it is useful at the outset to accumulate data for divisions by geographical subdivision and then to aggregate these data for national scale treatment.

The second step in educational assessment is to accumulate data in terms of relevant categories of information. Assessment of internal relationships within the system should consider four main categories of information: capacity, efficiency, effectiveness, and cost. Each of these will be considered in turn. Parenthetically, however, I should indicate that this discussion will use terms appropriate to the formal, school-types of divisions and the terms, although not the concepts, would be different for informal divisions.

Capacity - Description of the capacity of the existing educational system is our first concern. It is necessary to know what educational services exist, how they operate, and how many pupils they are able to accommodate.

The following data should be acquired:

1. number of graduates per year - time series
2. enrollment by grade and sex - time series
3. number of teachers by age, sex and qualification
4. number of teachers by teaching speciality and weekly hours of teaching
5. number of pupil spaces available (i.e., capacity of classrooms in terms of numbers of pupils which can be accommodated in a single session) classified according to the quality of the facilities

Efficiency - Our next concern is with the efficiency with which the capacity is utilized. By efficiency is meant the ratio of outputs to inputs. Our assumption for this analysis is that the divisions are accomplishing their purpose (whatever it may be and however relevant it may be to societal needs for educated persons). Leaving aside for the present the question of effectiveness, how efficiently are the schools operating?

The basic data required are:

1. number of graduates per year per 100 entrants - time series
2. number failed by grade
3. number dropped out by grade
4. number promoted by grade
5. pupils per full-time equivalent teacher

6. number of teaching personnel
7. number of administrative personnel
8. number of service personnel

Effectiveness - In this category of information we consider the questions: how well is the division performing, how good is the education being provided? Measurement and definition of the product of education is the most difficult problem in educational research. There is no way to conceive of the product of education except as some potentially observable change in the behavior of the one who has learned. The difficulty lies in finding objective ways to observe and to measure this behavior. The most sophisticated and reliable means for doing this are especially constructed achievement tests carefully prepared in the context of the educational system being studied. Unfortunately few developing countries possess appropriate instruments for this purpose. If they exist, they may be used as indicators of educational success rates (see below). Where they do not exist, less satisfactory indicators of effectiveness such as these must be used:

1. occupational participation rate (for vocational and professional divisions, the proportion of graduates who, one year later, are employed in the occupation for which they were trained)
2. educational success rate (for secondary schools the number and proportion of graduates who are admitted to further education by type of that further education)
3. qualitative judgment of the effectiveness of the division by the director or administrator of the division
4. qualitative judgment of the effectiveness of the division by outside but national qualified experts

Cost - Clearly, since the objective of the exercise is to determine resource allocation strategies for the future, cost data must be acquired. The precise form in which data can be collected will depend, however, on the present accounting procedures in use in the country. Ideally, the data indicated below should be collected by educational division and in practice much of it can be. However, some of the data probably will not be available in disaggregated form so that adjustments of the divisional data collected in terms of the other three categories may have to be made to match the definitions possible in the cost category.

The list of data required below is a minimum. If possible, further breakdowns by division should be sought.

1. total expenditures by year - time series
2. total operating expenditures by year - time series
3. total operating expenditures per year by
   - 3.1 cost of teaching services
   - 3.2 cost of administration
   - 3.3 cost of maintenance
   - 3.4 cost of books and equipment
4. total capital expenditures by year - time series
5. total capital expenditures per year by
   - 5.1 cost of new construction
   - 5.2 cost of repairs and modifications
   - 5.3 cost of fixed equipment
6. cost of new facilities per pupil space

Financial data, especially, may not be available for private school educational divisions. However, some effort should be devoted to the

acquisition of these data even if they may be acquired only from an inadequate partial sample. The reason for this is that private education may have significantly different cost functions which may provide interesting contrasts and criteria for public education and because estimates of private expenditures on education are necessary for calculating total national educational effort.

Analysis - Once these basic data are in hand the educational planning group may begin the assessment analysis of the existing educational system. The purpose of this analysis is twofold: to specify concretely the dimensions of the system, its elements and the present values of variables, and to identify, and if possible to indicate the magnitude of, major problems of its internal operation. From the assessment certain targets for educational development may be deduced and factors which will constrain future development may be identified.

Many forms of analysis might be applied to the data collected. Here only some of the more important types of analysis will be discussed.

First, analysis should be conducted by division on a national scale to investigate the internal operation of the system; in a later section we shall consider how the system suits educational needs of the society. For each division we should consider:

1. trend and rate of change over time in graduates
2. ratio of graduates per 100 entrants to the division in order to assess the efficiency of operation
3. pupils per pupil-space in order to assess the intensity of space utilization

4. pupils per full-time equivalent teacher in order to assess intensity of teacher utilization
5. pupils per teacher to assess the current teaching load and to provide a basis for determination of future teacher requirements
6. for vocational and professional divisions, the occupational participation rates to determine future level of graduations required to satisfy manpower requirements
7. success rates to indicate those divisions which are more or less successful in preparing pupils for further education and to establish a basis for estimating future flows into further education
8. current cost per pupil in order to estimate future monetary requirements for an expanded system
9. cost per pupil-space for new construction to prepare estimates of future capital expenditures
10. book and equipment costs per pupil to assess quality of instruction and future expenditure requirements
11. cost per graduate to provide an economic indicator of efficiency

These types of analysis are not conceptually adequate. We would like to have much more detailed and objective measures of performance of the system, especially indicators of the educational product, pupil achievement. Various efforts are underway to develop feasible indicators of these dimensions and there is hope that in time educational assessment may become more sophisticated. While not ideal, however, the types of analysis

discussed here are both feasible and useful for educational decision-making.

Target Setting

On the basis of the assessment of the present educational system's internal operation some, largely qualitative, targets for development may be identified. For example, it may be determined by specialists in the Ministry of Education that certain pupil-teacher ratios are too high and that a major target for development should be their reduction. This, in fact, has happened in several countries. If so, at this stage of the work such targets are only potential targets and must be assessed for feasibility and consistency in relationship to other targets whether qualitative, or derived from social or economic development needs. Evaluation and reconciliation of possible targets will be discussed below.

In addition to target pupil-teacher ratios certain other variables may be identified as targets required in order to improve the internal operation of the system: graduates per 100 entrants, retention rates per grade, retention rates by sex or by urban-rural classifications, total expenditure per pupil or books and equipment expenditure, etc., may also be judged by educationists to be deficient and improvement of a specified degree may be identified as potential targets.

Those technical relationships which are not identified as requiring improvement may be preserved as coefficients which will be used for planning. In working out the plan and in assessing feasibility of proposed strategies, values must be assumed for these coefficients; if qualitative improvement of the system does not require that these coefficients be

improved, the current values may be accepted for forecasting purposes.

In addition to potential targets which may be deduced from the assessment, others may appear from assessment of society's needs for educated persons. These societal needs may be considered in two categories, social development requirements and economic development requirements, and each of these has a time dimension. In each category present needs must be determined through an assessment of current conditions. In each case, however, since the educational system is now producing persons who will be active in the society for 40 or more years, future requirements for educated persons must be assessed. The means for doing this in the economic sphere have already been discussed in terms of manpower planning. Here we will consider educational targets arising from social needs.

The most obvious form of social need for education in an industrializing society is the reduction of illiteracy. Measures of current levels of illiteracy are usually available and need no elaboration here. Future expected illiteracy levels must be considered, however, particularly in those cases where dropout from the early years of elementary schooling is high. In establishing a target for the reduction of illiteracy, attention must be paid to the feasibility of improving retention so as to reduce the rate of illiteracy among the young members of the society. In addition, of course, programs for the eradication of adult illiteracy must be considered. Each of these potential targets must be assessed in terms of feasibility.

Another obvious social development requirement for education is the rate of scholarity in various portions of the school age population either for social equity reasons or in order to help to integrate specified groups (e.g., Altiplano Indians) into the national community. Assessment should

be undertaken of the scholarity rate by single years of age by sex, urban-rural residence, and region. If current population by age, sex, and place of residence data are available, the analysis is easy since enrollment data by age have been accumulated by division. Aggregating these data by age of pupil will provide the necessary additional information.

The future dimension of this particular type of need must be based on population projections which usually are available. In addition, however, a fundamental planning assumption will have to be made with regard to the probable level of scholarity rates by age in the future. This probable level is obviously not simply a function of the ability of the school system to provide places for pupils but also is a function of the demand, the propensity to attend school, which may be expected to change over time. Careful analysis is required to develop this estimate.

Educational targets deriving from social development objectives in the health field will largely be expressed in the form of manpower targets (number of doctors, etc. required). However, certain other dimensions, for example, improved health practices in the home, may involve either curriculum changes in the primary school for children of special extension type programs addressed to housewives. If the implication is curriculum change, programs for teacher training, curriculum development and appropriate materials preparation must be instituted.

This curriculum development need is illustrative of the more subtle development targets for education which are implied by the behavioral requirements of development listed in Figure 1. Each such target, because of the limited nature of professional knowledge in education which prevents us from knowing precisely what inputs would be required to achieve the

target, must be assessed as a "research and development" problem. That is, the current plan may only anticipate the original research and development implications of a proposed change. After the innovation is designed and tested, performance information should be available to permit later revisions of the plan to anticipate the input changes required to disseminate the change. Clearly, this type of change, which may be ultimately the most important type of change required if the educational system is to serve national development needs, will take some years to introduce and to have effect. However, if the current plan does not make provision for the research and development work necessarily prerequisite to achieving the change, even greater delay may be expected.

Each of the potential targets discussed above obviously relates to one or more specific divisions of the educational system. This relationship between social needs and specific educational institutions and output is a difficult and critical problem for planning purposes that has been given the name the "translation" problem. Since most of the discussion about this problem has been conducted in terms of manpower requirements we shall consider it in that context. It should be clear, however, that the problem applies to targets derived from social development requirements as well.

The problem may be stated this way: how may one link targets to specific educational institutions? Which educations provide preparation for specific occupations and in what proportion? If educational data have been treated to this point in terms of divisions, the problem is reduced but not solved. However, through the manpower assessment and through the occupational participation rate indicators obtained in the educational assessment, necessary information should be in hand. If, for example,

employers of electrical engineers expect in future to employ only graduates from accredited university programs in electrical engineering and if we know the occupational participation rate of graduates of all such divisions, the required number of new engineering graduates necessary (assuming the participation rate) can be calculated. For occupational and professional preparation, educational data on a divisional basis is the only suitable way so far suggested to deal with this problem.

However, it is not easily solved even so, because of the tension that exists between the improved accuracy of forecasts of occupational requirements, if these are made in terms of aggregates of occupations (scientific and technical workers rather than engineers of a specific type), and the need of educational decision-makers to have specific criteria for decisions about specific preparation programs. In any practical application some compromise must be reached between the more accurate gross forecast and the more useful narrow forecast.

In the area of social requirements the translation problem is not likely to be so acute. It is relatively easy to relate programs (such as literacy programs and elementary education) to targets (such as reduction of illiteracy). In general education content improvement efforts, however, the appropriate division for linkage to a development goal may be less clear cut. In any case, judgment and evaluation of the existing divisions on a detailed level seems to be the most useful method available at present.

Whatever the realm of concern may be then, the key to effective decision-making and planning in education is the explicit formulation of detailed educational targets. These may be derived from analysis of the current mode of operation of the educational system and from analysis of current and future needs of the society and economy for educated persons.

But whatever their origin, effective mobilization of resources for educational improvement demands that they be made explicit. Once they have been made explicit it becomes possible to determine the resources required to achieve them. It then is possible to confront various targets and their associated input requirements with each other and to confront the aggregated requirements for educational development with requirements of other sectors and to consider all of them explicitly in light of available human skills, organization, technology, and funds. Almost inevitably, requirements in education alone will exceed available resources, just as they do in the absence of planning. But through use of planning techniques the allocational issues can be confronted rationally and in good time so that in the long run, better use may be made of whatever resources exist or may be created in the future. The whole point in development is to increase availability of resources in the future so that more of the desires of individuals and groups may be satisfied. This implies that appropriate allocation of resources now will increase the rate at which more resources will become available in the future and will thereby increase the opportunities for human well-being, in the shortest possible time.

## Formulation of Educational Development Strategy

As we have seen, the most conventional way to express development targets is in terms of numbers of graduates by division (output is the term used although it is obvious that real output from education includes whatever learning dropouts have achieved prior to leaving school). Certain other targets, such as desired pupil-teacher ratios, books and equipment expenditures per pupil, etc., can be used. Qualitative targets which imply

curriculum or teaching method changes cannot be expressed quantitatively at present except in terms of numbers of pupils to be exposed to the new learning experiences.

Once targets have been expressed in quantitative terms, however, the process of calculating possible strategies is quite straightforward, though time-consuming. The logic of the process is:

1. For each target calculate the necessary number of graduates. Satisfying a target (e.g., net increase of engineers in the planning period) requires the production by education of the necessary number of engineers plus those trained who will not enter the occupation.

2. Calculate the number of entrants and enrollments by grade required to produce that number of graduates taking into account expected dropout rate.

3. Calculate the number of teachers required to handle that volume of pupils using the assumed pupil-teacher ratio.

4. Calculate the cost of books and equipment required by applying the expected books and equipment cost per pupil ratio.

5. If new facilities are needed, calculate the cost of new construction per pupil space.

6. Calculate the operating cost implied by the target by applying the expected cost per pupil ratio.

The same procedure should be followed in calculating the implications of pursuing each target. The process simply is to work backward from the target to the inputs required.

Once the implications of attaining each possible target are identified, reconciliation of targets in terms of feasibility and appropriate

priorities is required. This involves assessing both technical feasibility in the sense of available skill and knowledge and in terms of reasonable time-lag expectations (for example in designing, financing and building new facilities) and financial feasibility in terms of overall resource allocations available to education. In addition, consideration must be given to the implications on other divisions of changes in specific divisions (e.g., an increase in graduates from higher education implies increased secondary school graduates and possibly primary school completion as well).

In light of the scarcity of resources, most likely it will be impossible to achieve all targets. Analysis of overall feasibility and consistency of the development strategy must consider the relative significance of the various targets and establish priorities. Criteria for making these choices include present capacity and probable rate of expansion of key variables (teachers, selected pupils, school buildings), estimates of effectiveness of various divisions based on the earlier assessment, and cost per graduate estimates. Clearly, reconciling competing demands on educational resources is difficult and time consuming but doing it explicitly in light of available information is likely to result in better overall choices than those made in the traditional and uncoordinated way based on political influence.

To this point we have not discussed organizational problems in the planning process, although they are obviously of critical importance. Ideally, throughout the planning process educational planners are working as staff agents of the political authorities with responsibility for educational matters. It is important for these authorities to know what is

going on in the planning effort and to be in control of those efforts. On the other hand, it is impossible for the responsible principals to be personally involved in every phase of the work. Therefore, the planners must maintain constant communication with the political authorities they serve, they must inform these authorities about targets and criteria being used, and in fact they must provide the principals with all the technical information they will accept. The reason for this is very simple but often forgotten in the press of planning work: the political authorities are responsible for whatever action is taken; they must conceive it as their own work and must be committed to it, else implementation will not follow the preparation of the plan. Ultimate authority and responsibility for strategy choice and action upon it rest with the politically chosen authorities; they must be provided an opportunity to make these choices in the light of the best available information.

The relationship between the educational planner and the human resource development planner is the same as that between any central planning agency and sectoral planning groups. There should be a continuous two way flow of information between the groups. The human resource development planning group is responsible for providing overall target and allocational approximations to the educational development planners, while the educational planners feed detailed feasibility assessments and refined target allocations back to the central group.

In order to get implementation, the long term perspective plan for development in the educational sector must be linked with the annual operating budget procedure of the agencies involved. This may be done in the form of a short two or three year detailed plan, each year of which should

be reflected in the annual budget request and allocation. Responsibility for preparing this short term program plan rests with the educational planning office. Further, this office should monitor and report back to the central planning group performance information on a regular basis so that annual revisions of the plan can reflect changes in circumstances, success or failures in performance, and improved data as it becomes available.

## Footnotes

1. UNESCO, Economic and Social Aspects of Educational Planning, (Paris: 1964), p. 264.

2. Neil J. Smelser and S. M. Lipset, Social Structure and Social Mobility in Economic Development, (Chicago: Aldine Publishing Company, 1966), p. 2.

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